

# The Corps of Royal Canadian Electrical and Mechanical Engineers

## Canadian Vehicle Performance and Reliability Trial Procedures 1945

Canadian Army  
Engineering Design Branch



The RCEME Heritage Archives



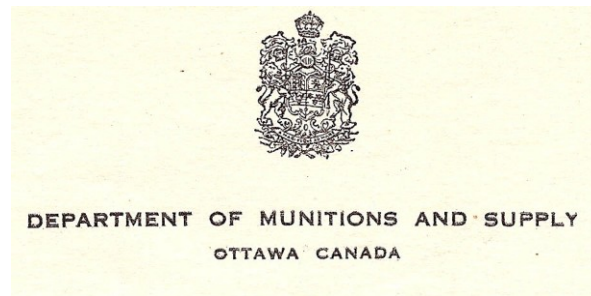
# Canadian Vehicle Performance and Reliability Trial Procedures 1945

## **Editor's Note**

This is a reproduction of a document that was produced at the end of the Second World War. It is a photographic study of the procedures and facilities used by the Army Engineering Design Branch of the Canadian Department of Munitions and Supply at that time. Those people who worked at the Ordnance Proving Grounds, or the successor organizations, ending with the Land Engineering and Test Establishment will probably recognize some of the test areas.

The original document is in the form of a letter. It is in extremely poor condition, and all the original forms and the first eight pages of the procedures are missing. The original is in the archives at the Canadian War Museum.

Doug Knight  
November 2007



May 28, 1945

Mr S. Swallow,  
A/Director of Design, Equipment, and Mechanization,  
1A Cockburn Street,  
Trafalgar Square,  
London SW1,  
England.

Dear Sir:

You will recall on your last visit here we discussed vehicle testing in general. At that time, I advised you that we were in the process of making up a procedure to cover a standard performance and reliability trial. The forms I referred to at that time are now completed, and are enclosed within the covers of this letter [not found – ed].

In addition to the forms, I have outlined by photograph, the method used to determine the required information. I should appreciate very much if you would pass your comments on both the forms and the procedures.

This does not cover all our equipment or activity, as you know. The purpose of this booklet is to make a start on standardization of War Department vehicle testing, so why not a committee within the Empire for this purpose.

Yours very truly,

(signed) C.W. Kirkpatrick,

for Assistant Director-General,  
Army Engineering Design Branch.

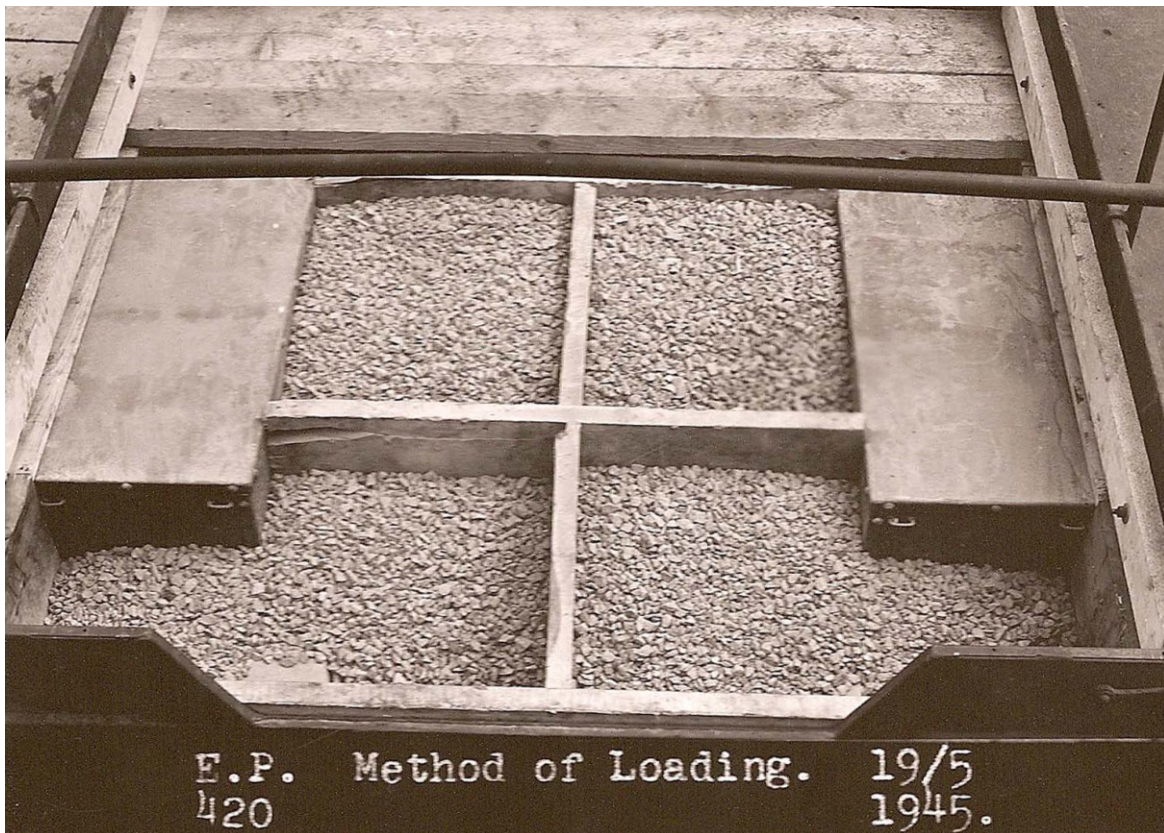
## **Procedure for Obtaining Information Required Under Performance and Reliability Trials**

[The first seven pages of the original report are missing – ed].

### **Loading**

E.P.420 - This illustration covers the method of loading any vehicle being subjected to the performance and reliability trials. The body is bulkheaded into six sections, the payload is evenly divided and cover boards are installed to prevent the load from shifting, crushed stone being used in the majority of these trials.

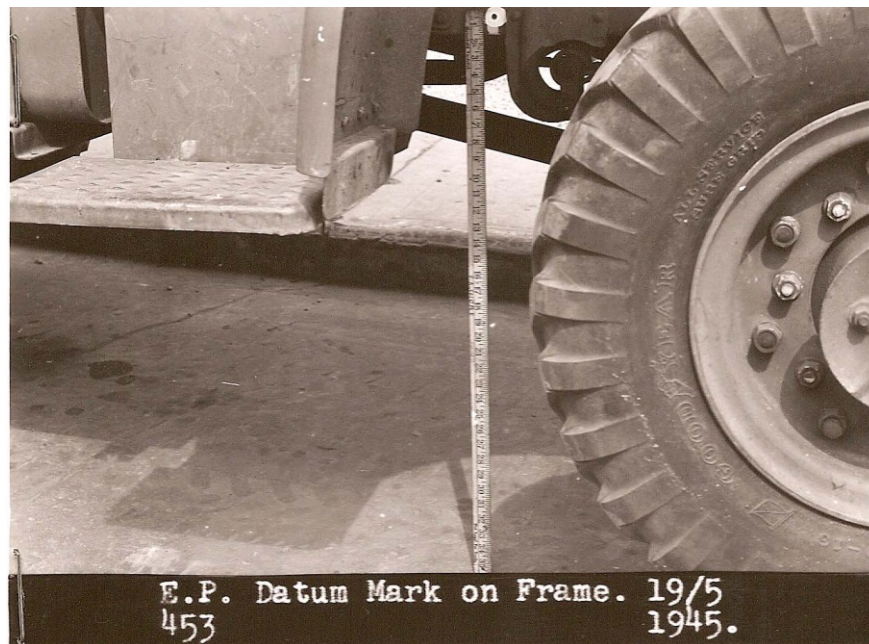
This method is used where body tests only are being run. In all other tests the load is allowed to shift but is redistributed every two hours (leveled off).





## Frame Measurements

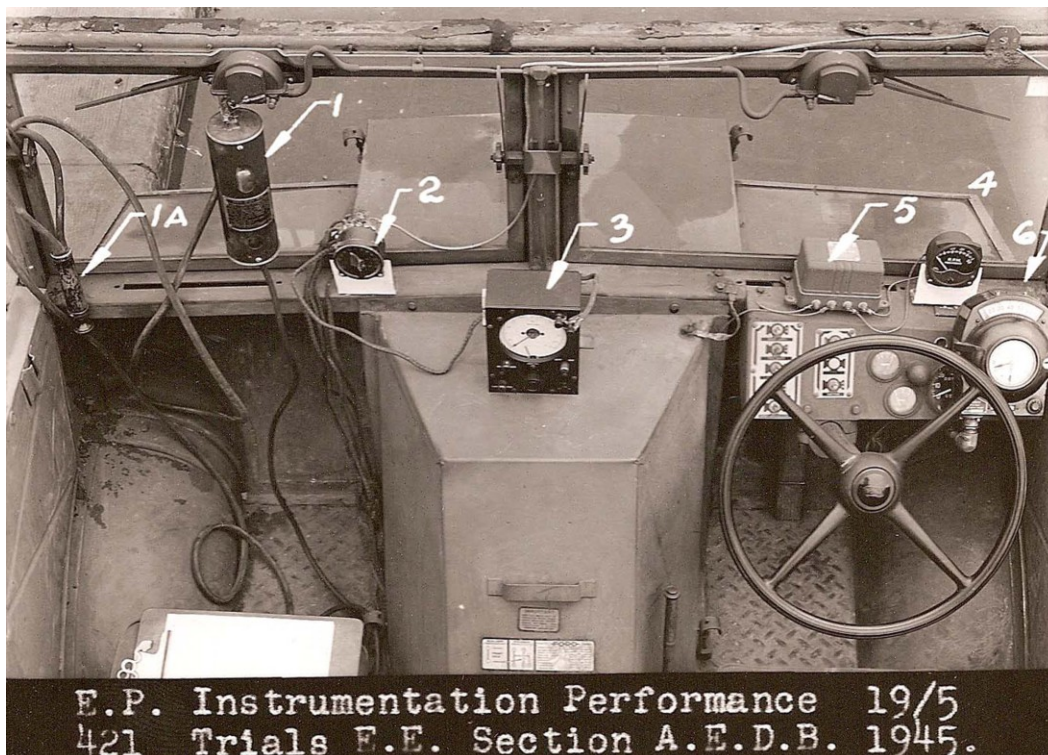
E.P. 452 and E.P. 453: For photographic purposes this picture was taken outside, whereas normally the two stands at the front, rear of the frame are used only on a level floor. After the vehicle is properly loaded it is jacked up and the two stands pictured are inserted under the frame ends, marks are then painted on the floor and numbered so that the vehicle can be set in exactly the same spot. Data points are then marked on the frame and lettered or numbered for future reference. The information is included on a sheet and filed, Photograph No. 453 illustrates one such datum point. At certain predetermined intervals the frame is again measured for frame sag.



## Test Instruments

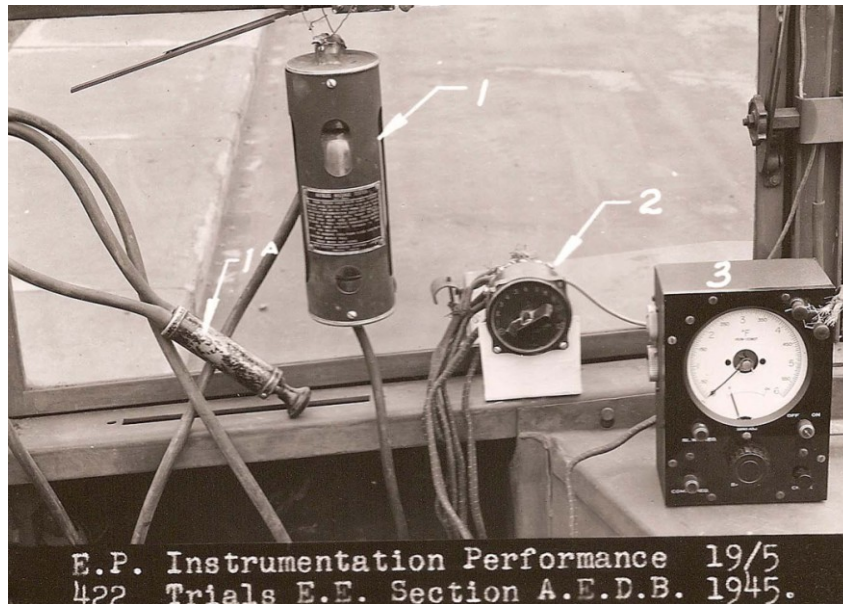
E.P.421: After the vehicle has been properly weighed, loaded and the frame measured, instruments are installed as illustrated:

1. A gasoline mileage tester, manufactured by the Auto Electric Service Company, Toronto, Canada, together with its pump (1A), is installed for the purpose of collecting information concerning fuel miles per gallon;
2. Multipole switch (12 points), manufactured by the Lewis Engineering Company, Naugatuck, Connecticut, U.S.A. and used for the purpose of selecting various thermocouples installed at the required point, This instrument is used in conjunction with No. 3;
3. Potentiometer, Model 73-F-0 manufactured by the Lewis Engineering Company, Naugatuck, Connecticut, U.S.A. This instrument, when properly calculated, is direct reading in °F;
4. Tachometer, Model-D-1 manufactured by the Sun Manufacturing Company, Chicago, Illinois, U.S.A. and used to record Engine R.P.M. This instrument is scaled from 0-5000 P.P.M.
5. Tachometer Transmitter, Model E-1 manufactured by the Sun Manufacturing Company, Chicago, Illinois is the sending device for No. 4 and is connected directly to the distributor.
6. Tachograph, Model A, 6-8, manufactured by the Wagner Electric Corporation, St. Louis, Missouri, U.S.A. This instrument will be described more fully in E.P.423 below.



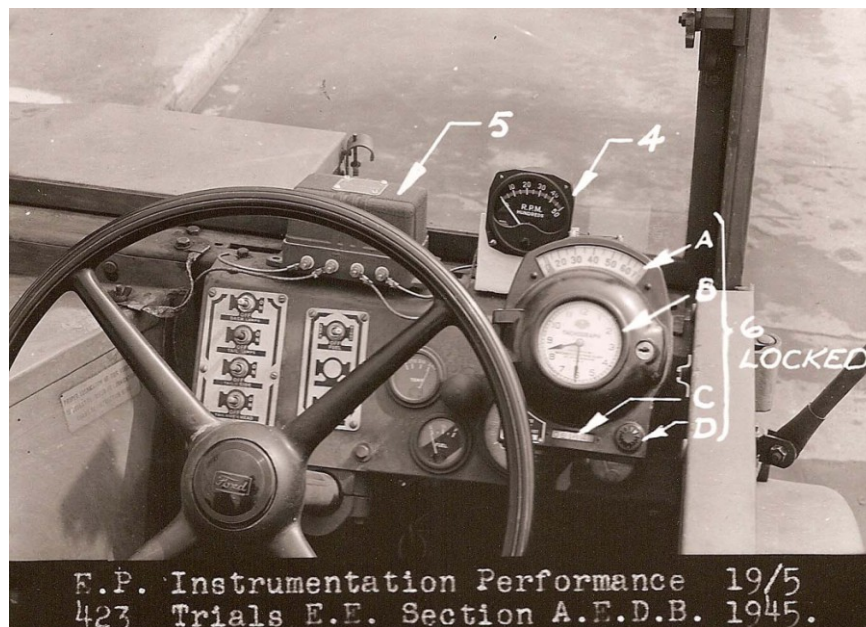


E.P.422: A close-up of instruments on the mate's [co-driver] side of cab.



E.P.423 and E.P.425: The instruments on the driver's side of the cab. The tachograph illustrated comprises an instrument which is connected electrically to the battery and manually (via speedometer cable) to the power transmission line,

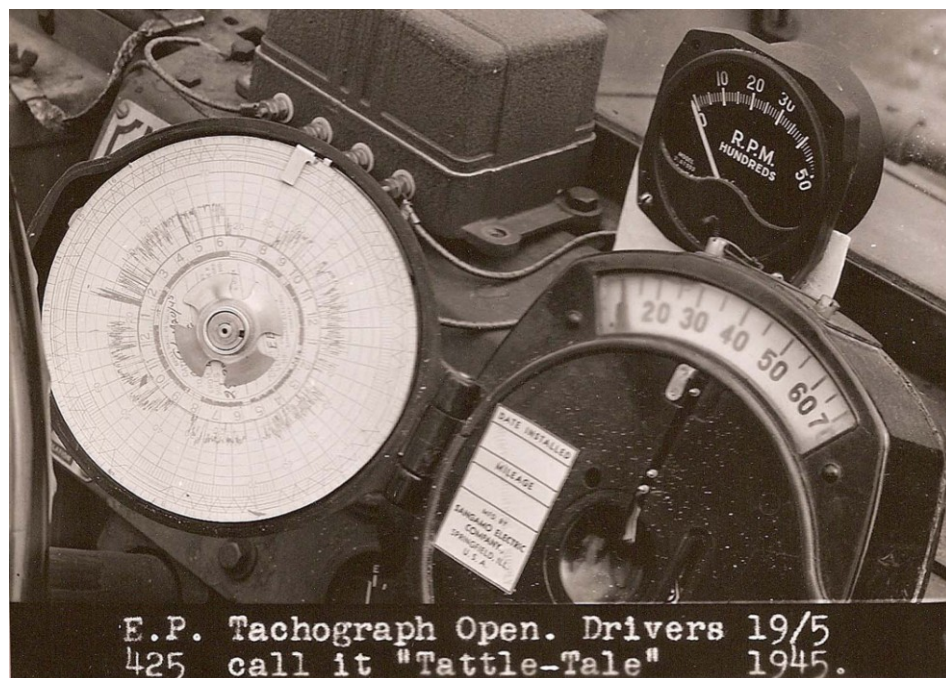
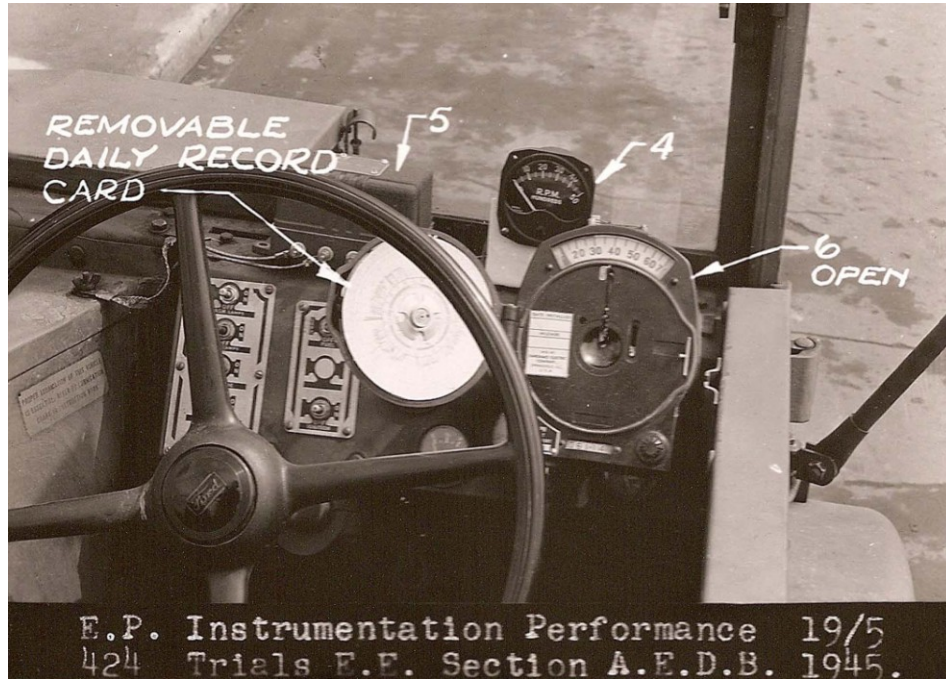
- A. meter recording miles per hour
- B. time clock
- C. odometer
- D. A red indicating light which can be set to flash ON at any predetermined speed.





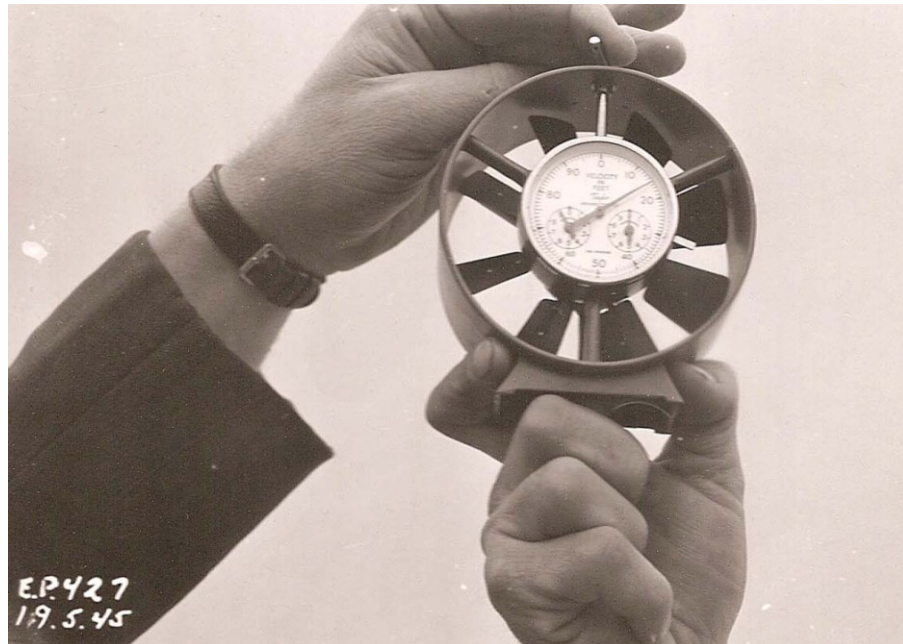
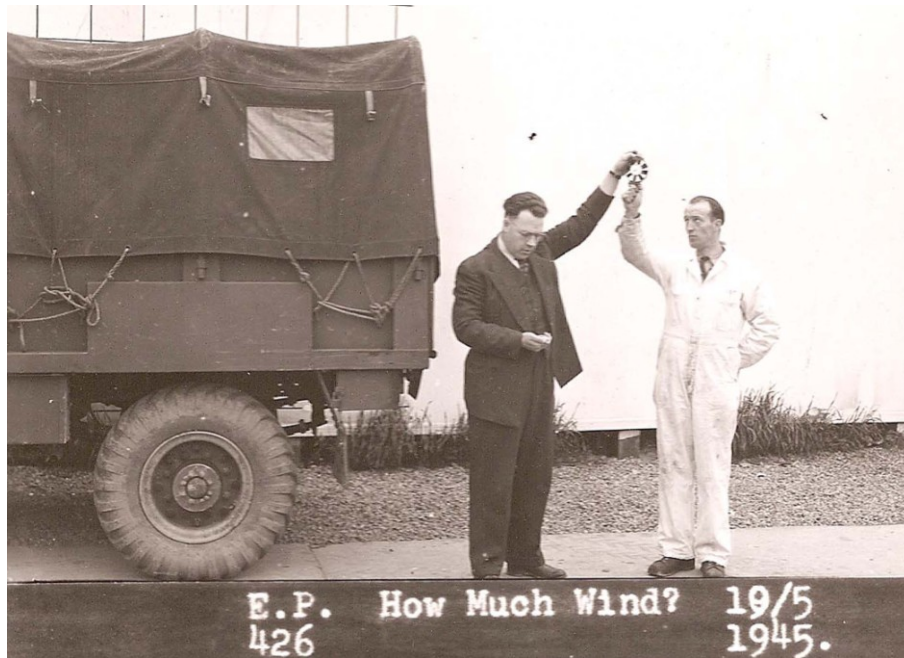
## Tachograph

E.P. 424 and E.P. 425: Inside of the tachograph, which is normally locked, is a removable daily record card. Analysis of this card is covered more fully below. In addition to the information given on the next page, a needle indicates whether the engine is running with the rear wheel jacked up. By this means a complete record of the vehicle's operation for a 24-hour period is made and can be filed.



## Wind Measuring

E.P. 426 and E.P. 427: To record wind speed an anemometer manufactured by the Taylor Instrument Company, Rochester, N.Y. U.S.A., is used in conjunction with a stop watch. No performance trials are attempted when the wind speed is greater than 15 m.p.h. unless the wind speed and direction in relation to the vehicle is clearly stated. The anemometer registers the velocity in feet. This is supplied in a suitable carrying case.





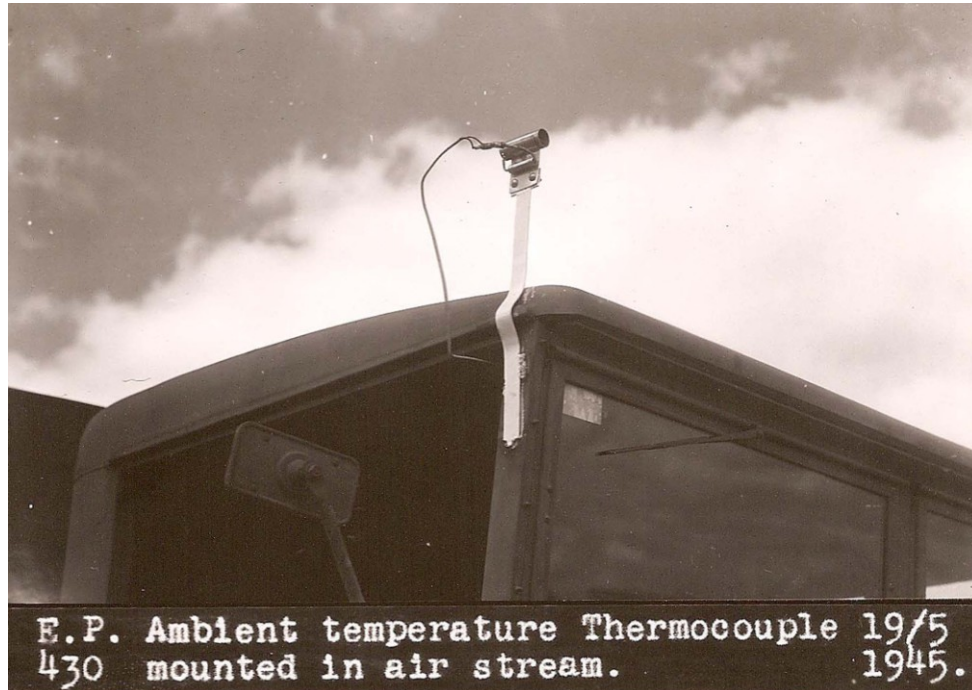
## Towed Cooling Trials

E.P. 428 and E.P. 429: Illustrates the method of obtaining information on a towed cooling trial. A tachometer transmitter, Model E-1 No.5 is installed on the vehicle being tested. A lead wire is then run from this transmitter (#10) to the towed vehicle where it is connected to a tachometer. The recording of this instrument allows the driver of the towed vehicle to maintain a constant engine speed in the towing unit. The driver of the towing unit merely keeps his throttle wide open, the test observer being free to record information.



## Ambient Temperature

E.P.430: Illustrates the mounting of an ambient temperature thermocouple by tack welding of the mounting bracket on the windshield pillar post.



## Tire Deflection

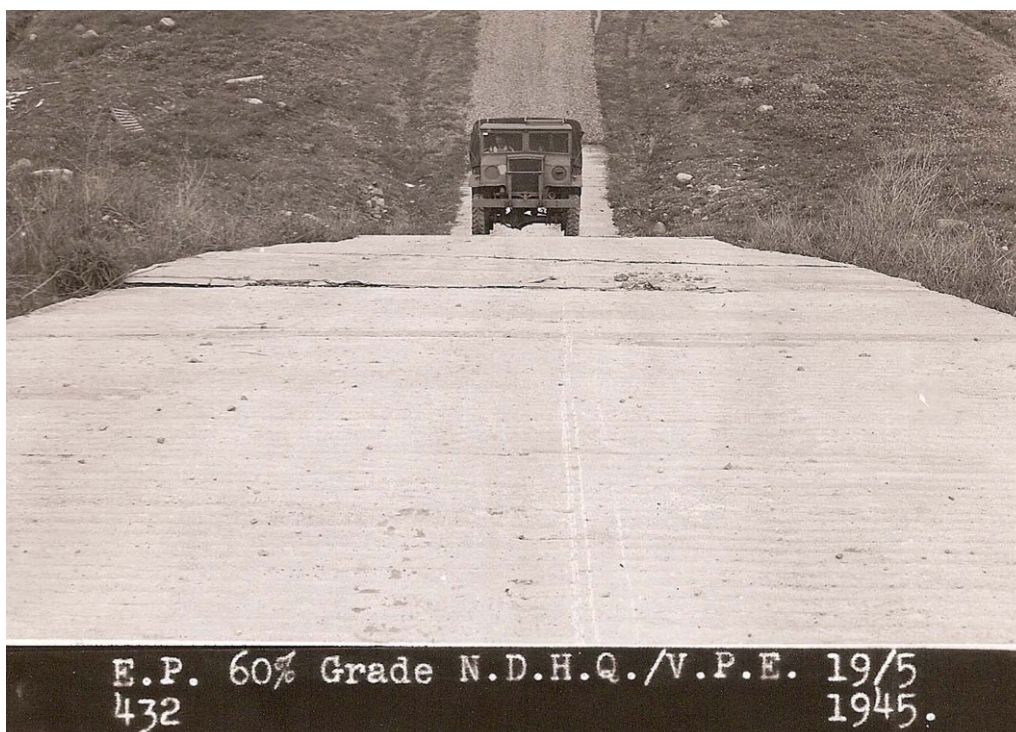
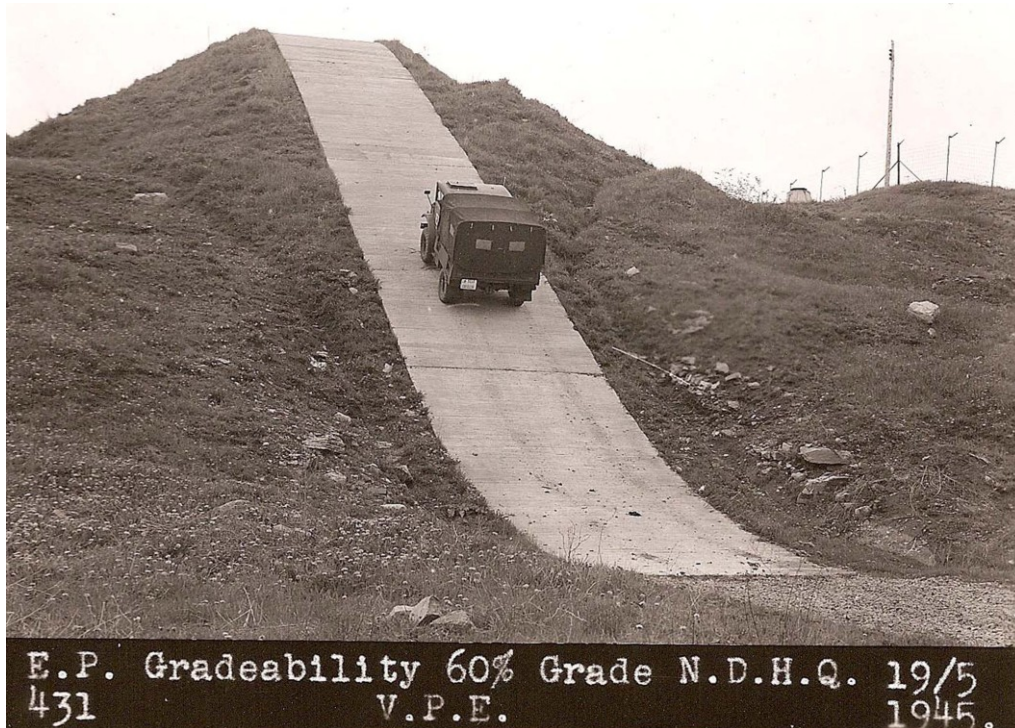
E.P.446: Tire deflections are determined by the use of a tire deflection gauge.





## Gradeability

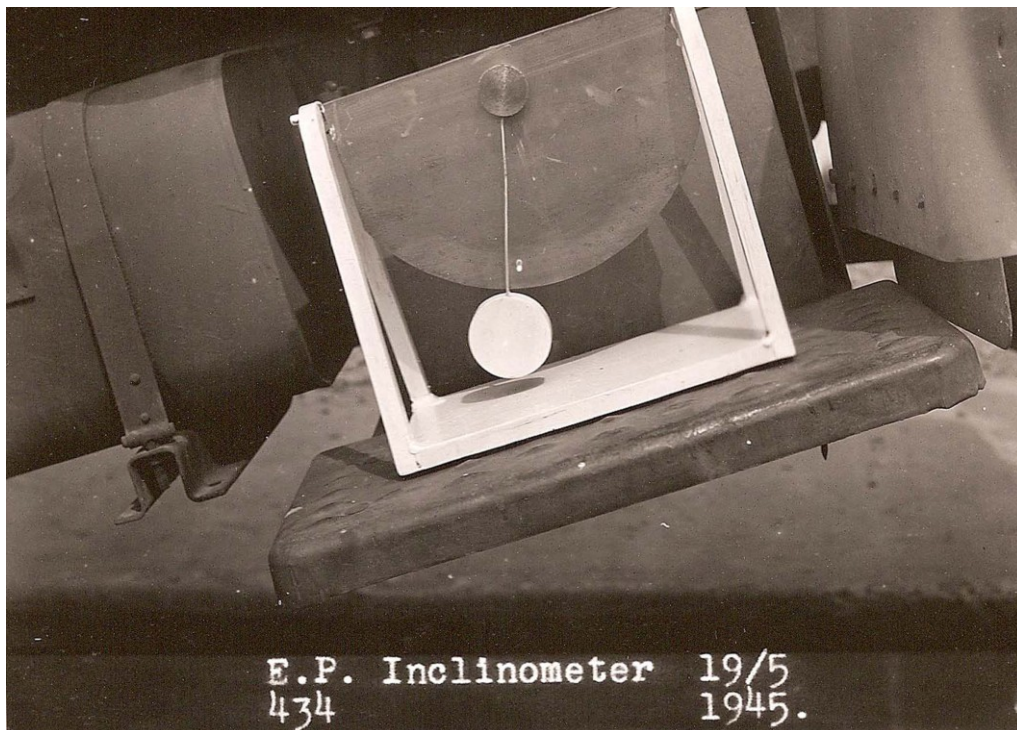
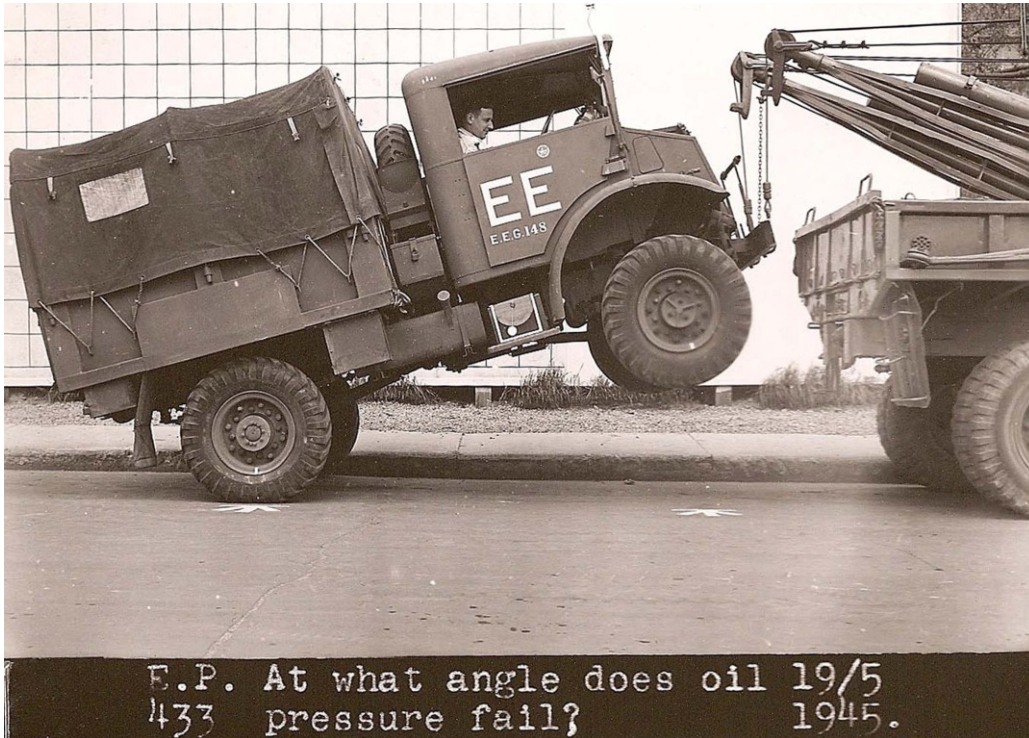
E.P.431 and E.P.432: A number of slopes, gravel, and grass, are available to this Branch for the purpose of gathering gradeability information. The 60% (31°) concrete grade illustrated is at the National Defense Headquarters, Vehicle Proving Establishment, Ottawa.





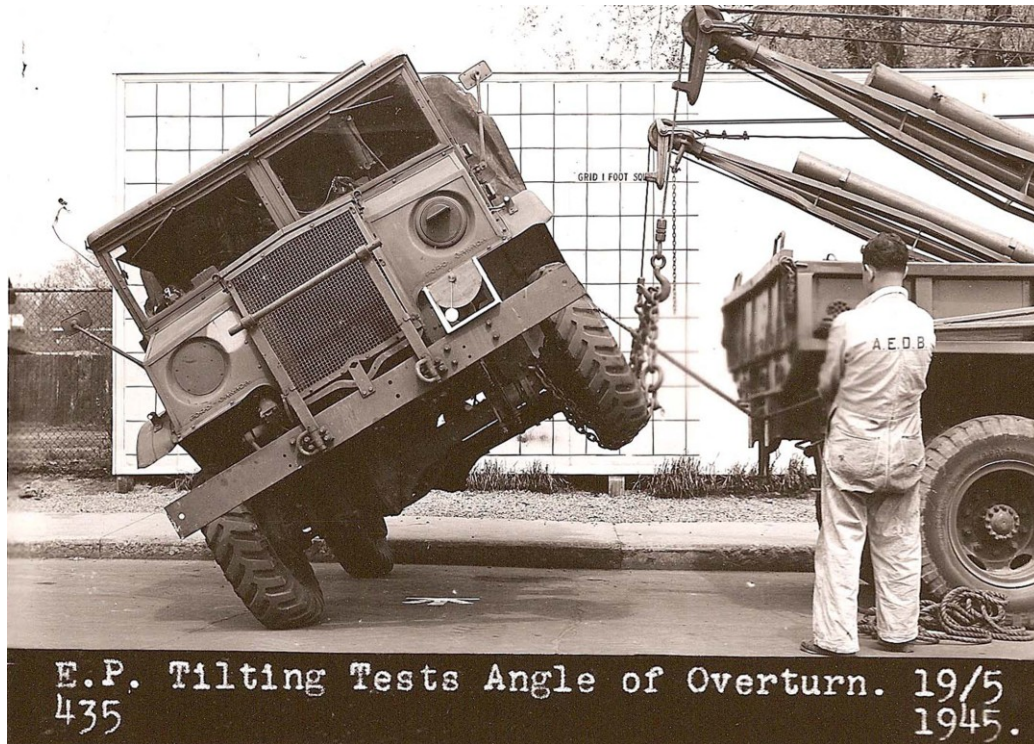
## Oil Pressure Failure

E.P.433: In order to obtain this information, an inclinometer is first levelled with the vehicle sitting level. The unit is then raised slowly until the oil pressure fails.



## Tilt Tests

E.P. 435: The side of the vehicle is raised from the ground until the tip point is reached, and the angle measured on the inclinometer.



## Stopping Distances

To gather information regarding stopping distances a Tapley brake meter is used. This instrument was purchased from Tapley Electric and Company, Totten, Southampton, England. For maximum speed, an electric speedometer which is driven by the bicycle wheel arrangement fastened to the rear of the vehicle is used. This unit is commonly called a fifth wheel speedometer and is extremely accurate. It is manufactured by General Motors Proving Grounds, Milford, Michigan, U.S.A. (not illustrated).

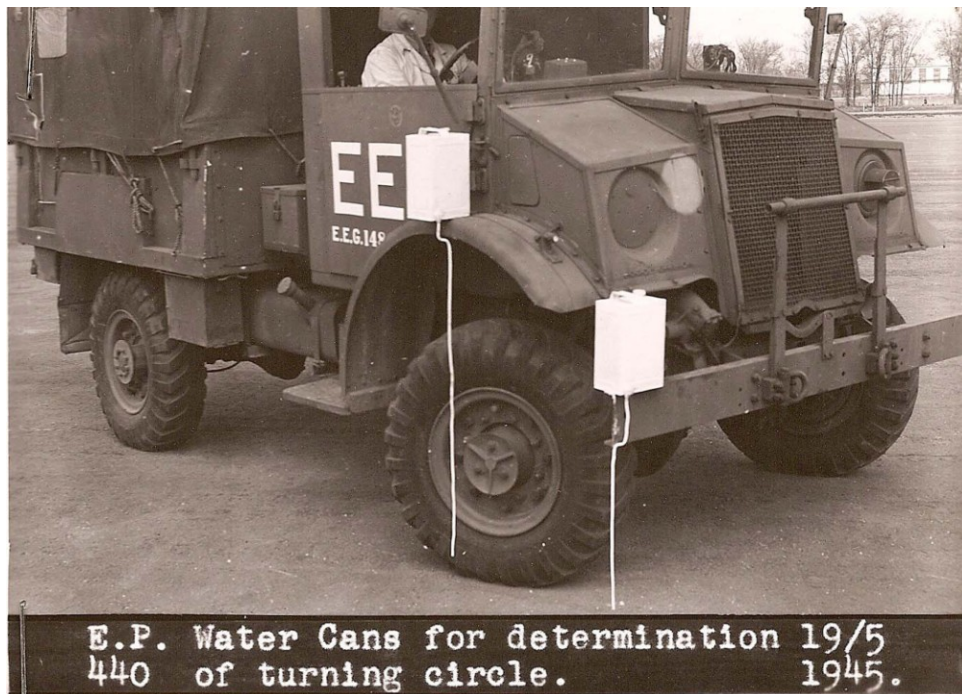


## Turning Circles

E.P. 439: To determine turning circles, water cans are mounted in a manner more clearly illustrated in E.P.440.



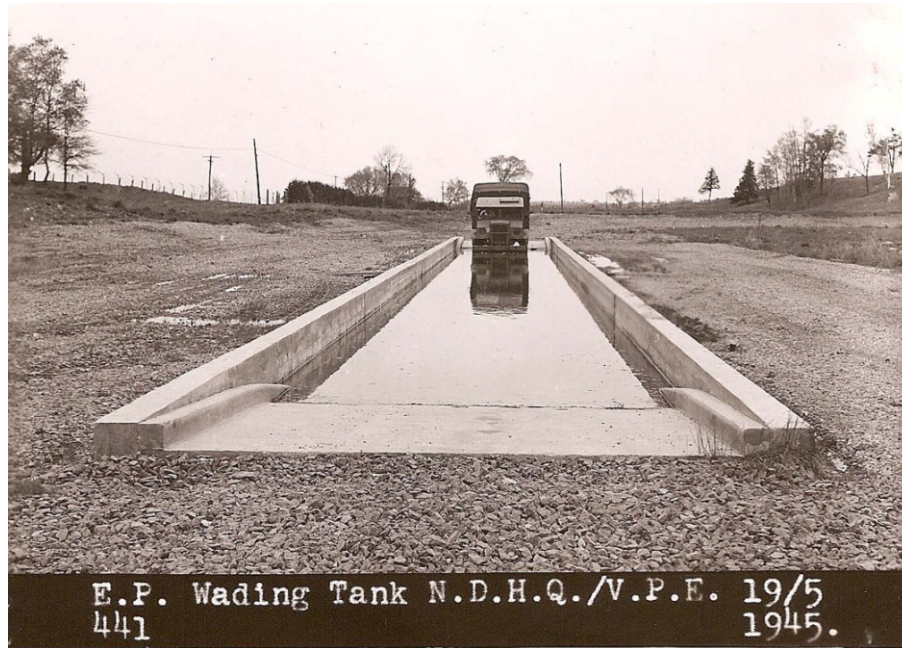
E.P.440: Shows how the mounting of turning circle water cans with their tubes. The tubes are stiff enough that they can be adjusted to any given point.





## Wading and Splash Trials

E.P.441: An adjustable level water trough is used for wading and splash trials. The maximum depth is approximately 4 ft. 6 inches.



## Center of Balance

E.P.442: A "V" block long enough to contact the frame transversally is used in conjunction with hydraulic jacks to determine the centre of balance, (note sand bags to simulate the weight of driver and mate.)





## Obstacle Course

E.P.443: This concrete course has been constructed to make available all the required obstacles specified in Munition and Supply specification O.A.65



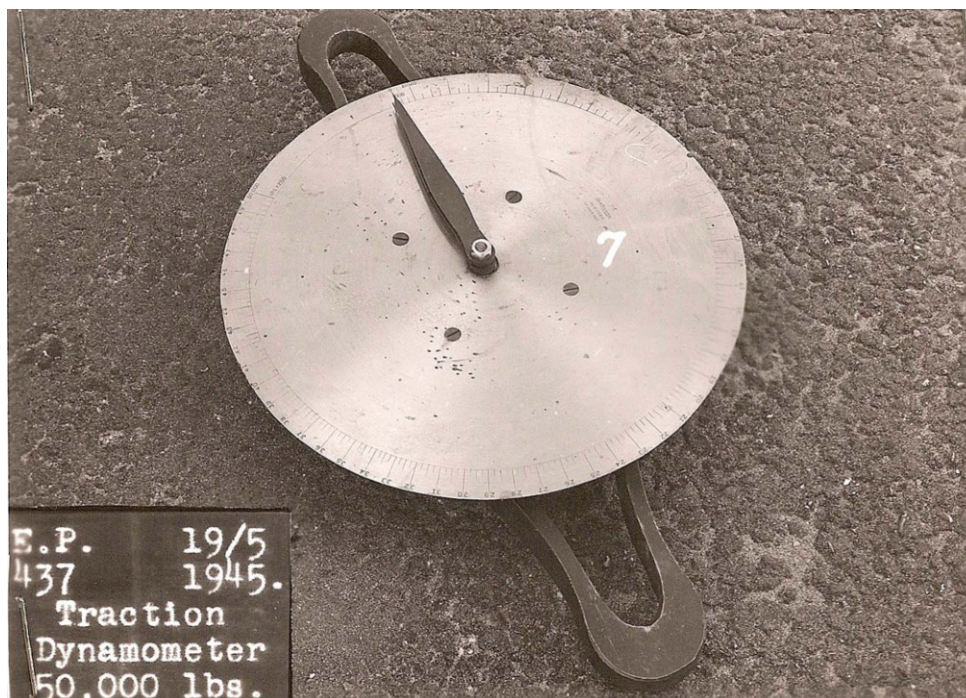


## Maximum Drawbar Pull

E.P.436: For maximum draw bar pull a traction dynamometer is mounted in the towing line. The speed and gear used is recorded on form [not attached – ed].



E.P.437: Traction dynamometer purchased from Traction Dynamometer Company, Chatillon, N.Y. U.S.A. This dynamometer is a scale calibrated from 0-50,000 in increments of 250 lbs.





## Rolling Resistance

E.P.447 and E.P.448: Rolling resistance was obtained by winching the vehicle in neutral gear across the surface desired. A smaller traction dynamometer than that above is mounted in the towing line. This instrument reads to 1000 lbs. in increments of 10 lbs.





## Landing Craft Tank Ramp

E.P.449: Illustrates the Landing Craft Tank ramp recently constructed at Indy HQ to check chassis interference point.





